A3 cont.

(a) suspending the biological material in a cryoprotective equilibration solution, having a concentration of cryoprotectant(s) below that sufficient to protect against ice formation to the glass transition temperature of the cryoprotective equilibration solution;

(b) rinsing the equilibrated biological material with a vitrification solution, having a concentration of cryoprotectant(s) sufficient to protect against ice formation to the glass transition temperature of the vitrification solution; and

(c) dropping the vitrification solution-rinsed biological material in the form of discrete microdroplets of vitrification solution, the microdroplets having an average volume of 10 μL or less, onto a substantially stationary solid surface with heat conductivity, as measured at 20° C, of about 10 W/(m-k) which has previously been cooled to a temperature of about -150° C to about -180 ° C.

Please substitute amended claim 9, below, for claim 9 as filed.

9. (AMENDED) An improved method for cryopreserving biological material suspended in a vitrification solution, wherein the improvement comprises contacting discrete microdroplets having an average volume of 10 μL or less of the vitrification solution containing the biological material with a substantially stationary solid cryogenic surface having a temperature of about -150°C to about -180 °C, said surface having a thermal conductivity at 20°C of greater than about 10 W/(m-k) and removing the frozen microdroplets from said surface.

A4

Please substitute amended claim 10, below, for claim 10 as filed.

10. (AMENDED) A method for the vitrification of oocytes, said method comprising the steps of:

(a) suspending the oocytes in a cryoprotective equilibration solution, having a concentration of cryoprotectant(s) below that A5 sufficient to protect against ice formation to the glass transition temperature of the cryoprotective equilibration solution;

(b) rinsing the equilibrated oocytes with a vitrification solution, having a concentration of cryoprotectant(s) sufficient to protect against ice formation to the glass transition temperature of the vitrification solution; and

(c) dropping the vitrification solution-rinsed oocytes in the form of discrete microdroplets of vitrification solution, the microdroplets having an average volume of 10 μL or less, onto a substantially stationary solid surface with heat conductivity, as measured at 20° C, of about 10 W/(m-k) which has previously been cooled to a temperature of about -150 ° C to about -180° C.

Please substitute amended claim 19, below, for claim 19 as filed.

19. (AMENDED) An improved method for cryopreserving oocytes suspended in a vitrification solution, wherein the improvement comprises contacting discrete microdroplets containing 10 μL or less of A6 the vitrification solution containing the oocytes with a substantially stationary solid surface having a temperature of about -150 ° C to about -180° C, said surface having a thermal conductivity 20° C of greater than about 10 W/(m-k) and removing the frozen microdroplets from said surface.

Please add claims 28 - 35 as follows:

28. (NEW) A device for the rapid vitrification of biological materials, the device comprising:

A7

(a) an insulated external container;

(b) a cryogenic medium contained within the external container;

(c) a solid cryogenic mass at least partially submerged within the cryogenic medium, wherein the cryogenic mass has a thermal conductivity, measured at 20° C, of about 10 W/(m-k); and

(d) a substantially stationary cryogenic layer positioned on an exposed top surface of the solid cryogenic mass and in thermally conductive contact therewith.

29. (NEW) The device of claim 28, wherein the cryogenic medium comprises liquid nitrogen.

30. (NEW) The device of claim 28, wherein the exposed upper surface of the cryogenic mass is maintained at a temperature of about -160° C to about -180° C.

31. (NEW) The device of claim 28, wherein the cryogenic layer comprises a metal foil.

32. (NEW) The device of claim 31, wherein the metal foil is aluminum foil.

33. (NEW) The device of claim 28, wherein the cryogenic layer has a thickness of from about 0.10 mm to about 0.20 mm.

34. (NEW) The device of claim 28, wherein the cryogenic layer is removably positioned on an exposed top surface of the solid cryogenic mass and in thermally conductive contact therewith.

A7 CONT.

35. (NEW) A method for the vitrification of biological materials, said method comprising the steps of:

(a) suspending the biological material in a cryoprotective equilibration solution, having a concentration of cryoprotectant below that sufficient to protect against ice formation to the glass transition temperature of the cryoprotective equilibration solution;

(b) rinsing the equilibrated biological material with a vitrification solution, the solution having a concentration of cryoprotectant sufficient to protect against ice formation to the glass transition temperature of the vitrification solution; and

(c) contacting the vitrification solution-rinsed biological material in the form of discrete microdroplets of vitrification solution, the microdroplets having an average volume of 10 μL or less, onto a cryogenic surface of the device of claim 28, wherein such surface is maintained at a temperature of about minus-150° C to about -180° C.